Table A9-3. Discharge of rectangular submerged orifices with bottom and side contractions suppressed, in ft^3/sec. Computed from the formula $Q = 0.70A\,(2g\,\Delta h)^{0.5}$

Head Δh, ft	Cross-sectional area A of orifice, square feet							
	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0
0.04	2.25	2.81	3.37	3.93	4.49	5.62	6.74	7.86
.05	2.51	3.14	3.77	4.40	5.02	6.28	7.54	8.79
.06	2.75	3.44	4.13	4.82	5.50	6.88	8.26	9.63
.07	2.97	3.72	4.46	5.20	5.94	7.43	8.92	10.4
.08	3.18	3.97	4.77	5.56	6.36	7.94	9.53	11.1
.09	3.37	4.21	5.06	5.90	6.74	8.43	10.1	11.8
.10	3.55	4.44	5.33	6.22	7.11	8.88	10.7	12.4
.11	3.73	4.66	5.59	6.52	7.45	9.32	11.2	13.0
.12	3.89	4.86	5.84	6.81	7.78	9.73	11.7	13.6
.13	4.05	5.06	6.08	7.09	8.10	10.1	12.2	14.2
.14	4.20	5.25	6.31	7.36	8.41	10.5	12.6	14.7
.15	4.35	5.44	6.53	7.61	8.70	10.9	13.1	15.2
.16	4.49	5.62	6.74	7.86	8.99	11.2	13.5	15.7
.17	4.63	5.79	6.95	8.11	9.26	11.6	13.9	16.2
.18	4.77	5.96	7.15	8.34	9.53	11.9	14.3	16.7
.19	4.90	6.12	7.35	8.57	9.79	12.2	14.7	17.1
.20	5.02	6.28	7.54	8.79	10.0	12.6	15.1	17.6
.21	5.15	6.44	7.72	9.01	10.3	12.9	15.4	18.0
.22	5.27	6.59	7.90	9.22	10.5	13.2	15.8	18.4
.23	5.39	6.74	8.08	9.43	10.8	13.5	16.2	18.9
.24	5.50	6.88	8.26	9.63	11.0	13.8	16.5	19.3
.25	5.62	7.02	8.43	9.83	11.2	14.0	16.9	19.7
.26	5.73	7.16	8.59	10.0	11.5	14.3	17.2	20.1
.27	5.84	7.30	8.76	10.2	11.7	14.6	17.5	20.4
.28	5.94	7.43	8.92	10.4	11.9	14.9	17.8	20.8
.29	6.05	7.56	9.08	10.6	12.1	15.1	18.2	21.2
.30	6.15	7.69	9.23	10.8	12.3	15.4	18.5	21.5
.31	6.26	7.82	9.38	10.9	12.5	15.6	18.8	21.9
.32	6.36	7.94	9.53	11.1	12.7	15.9	19.1	22.2
.33	6.45	8.07	9.68	11.3	12.9	16.1	19.4	22.6
.34	6.55	8.19	9.83	11.5	13.1	16.4	19.7	22.9
.35	6.65	8.31	9.97	11.6	13.3	16.6	19.9	23.3
.36	6.74	8.43	10.1	11.8	13.5	16.9	20.2	23.6
.37	6.83	8.54	10.3	12.0	13.7	17.1	20.5	23.9
.38	6.93	8.66	10.4	12.1	13.9	17.3	20.8	24.2
.39	7.02	8.77	10.5	12.3	14.0	17.5	21.0	24.6
.40	7.11	8.88	10.7	12.4	14.2	17.8	21.3	24.9
.41	7.19	8.99	10.8	12.6	14.4	18.0	21.6	25.2
.42	7.28	9.10	10.9	12.7	14.6	18.2	21.8	25.5
.43	7.37	9.21	11.1	12.9	14.7	18.4	22.1	25.8
.44	7.45	9.32	11.2	13.0	14.9	18.6	22.4	26.1
.45	7.54	9.42	11.3	13.2	15.1	18.8	22.6	26.4
.46	7.62	9.52	11.4	13.3	15.2	19.0	22.9	26.7
.47	7.70	9.63	11.6	13.5	15.4	19.3	23.1	27.0
.48	7.78	9.73	11.7	13.6	15.6	19.5	23.4	27.2
.49	7.86	9.83	11.8	13.8	15.7	19.7	23.6	27.5
.50	7.94	9.93	11.9	13.9	15.9	19.9	23.8	27.8
.51	8.02	10.0	12.0	14.0	16.0	20.1	24.1	28.1
.52	8.10	10.1	12.2	14.2	16.2	20.3	24.3	28.4
.53	8.18	10.2	12.3	14.3	16.4	20.4	24.5	28.6

Table A9-3 [continued]. Discharge of rectangular submerged orifices with bottom and side contractions suppressed, in ft3/sec. Computed from the formula $Q = 0.70A\,(2g\,\Delta h)^{0.5}$

Head Δh, ft	Cross-sectional area A of orifice, square feet						
	8.0	10.0	12.0	14.0	16.0	18.0	20.0
0.04	8.99	11.2	13.5	15.7	18.0	20.2	22.5
.05	10.0	12.6	15.1	17.6	20.1	22.6	25.1
.06	11.0	13.8	16.5	19.3	22.0	24.8	27.5
.07	11.9	14.9	17.8	20.8	23.8	26.8	29.7
.08	12.7	15.9	19.1	22.2	25.4	28.6	31.8
.09	13.5	16.9	20.2	23.6	27.0	30.3	33.7
.10	14.2	17.8	21.3	24.9	28.4	32.0	35.5
.11	14.9	18.6	22.4	26.1	29.8	33.5	37.3
.12	15.6	19.5	23.4	27.2	31.1	35.0	38.9
.13	16.2	20.3	24.3	28.4	32.4	36.5	40.5
.14	16.8	21.0	25.2	29.4	33.6	37.8	42.0
.15	17.4	21.8	26.1	30.5	34.8	39.2	43.5
.16	18.0	22.5	27.0	31.5	36.0	40.4	44.9
.17	18.5	23.2	27.8	32.4	37.1	41.7	46.3
.18	19.1	23.8	28.6	33.4	38.1	42.9	47.7
.19	19.6	24.5	29.4	34.3	39.2	44.1	49.0
.20	20.1	25.1	30.1	35.2	40.2	45.2	50.2
.21	20.6	25.7	30.9	36.0	41.2	46.3	51.5
.22	21.1	26.3	31.6	36.9	42.2	47.4	52.7
.23	21.6	26.9	32.3	37.7	43.1	48.5	53.9
.24	22.0	27.5	33.0	38.5	44.0	49.5	55.0
.25	22.5	28.1	33.7	39.3	44.9	50.6	56.2
.26	22.9	28.6	34.4	40.1	45.8	51.6	57.3
.27	23.4	29.2	35.0	40.9	46.7	52.5	58.4
.28	23.8	29.7	35.7	41.6	47.6	53.5	59.4
.29	24.2	30.3	36.3	42.4	48.4	54.5	60.5
.30	24.6	30.8	36.9	43.1	49.2	55.4	61.5
.31	25.0	31.3	37.5	43.8	50.0	56.3	62.6
.32	25.4	31.8	38.1	44.5	50.8	57.2	63.6
.33	25.8	32.3	38.7	45.2	51.6	58.1	64.5
.34	26.2	32.8	39.3	45.9	52.4	59.0	65.5
.35	26.6	33.2	39.9	46.5	53.2	59.8	66.5
.36	27.0	33.7	40.4	47.2	53.9	60.7	67.4
.37	27.3	34.2	41.0	47.8	54.7	61.5	68.3
.38	27.7	34.6	41.6	48.5	55.4	62.3	69.3
.39	28.1	35.1	42.1	49.1	56.1	63.1	70.2
.40	28.4	35.5	42.6	49.7	56.8	64.0	71.1
.41	28.8	36.0	43.2	50.4	57.6	64.7	71.9
.42	29.1	36.4	43.7	51.0	58.2	65.5	72.8
.43	29.5	36.8	44.2	51.6	58.9	66.3	73.7
.44	29.8	37.3	44.7	52.2	59.6	67.1	74.5
.45	30.1	37.7	45.2	52.8	60.3	67.8	75.4
.46	30.5	38.1	45.7	53.3	61.0	68.6	76.2
.47	30.8	38.5	46.2	53.9	61.6	69.3	77.0
.48	31.1	38.9	46.7	54.5	62.3	70.1	77.8
.49	31.5	39.3	47.2	55.1	62.9	70.8	78.6
.50	31.8	39.7	47.7	55.6	63.6	71.5	79.4
.51	32.1	40.1	48.1	56.2	64.2	72.2	80.2
.52	32.4	40.5	48.6	56.7	64.8	72.9	81.0
.53	32.7	40.9	49.1	57.3	65.4	73.6	81.8

Table A9-3 [continued]. Discharge of rectangular submerged orifices with bottom and side contractions suppressed, in ft3/sec. Computed from the formula $Q = 0.70A\,(2g\,\Delta h)^{0.5}$

Head Δh, ft	Cross-sectional area A of orifice, square feet							
	22	24	26	28	30	32	34	36
0.04	24.7	27.0	29.2	31.5	33.7	36.0	38.2	40.4
.05	27.6	30.1	32.7	35.2	37.7	40.2	42.7	45.2
.06	30.3	33.0	35.8	38.5	41.3	44.0	46.8	49.5
.07	32.7	35.7	38.6	41.6	44.6	47.6	50.5	53.5
.08	35.0	38.1	41.3	44.5	47.7	50.8	54.0	57.2
.09	37.1	40.4	43.8	47.2	50.6	53.9	57.3	60.7
.10	39.1	42.6	46.2	49.7	53.3	56.8	60.4	64.0
.11	41.0	44.7	48.4	52.2	55.9	59.6	63.3	67.1
.12	42.8	46.7	50.6	54.5	58.4	62.3	66.2	70.1
.13	44.6	48.6	52.7	56.7	60.8	64.8	68.9	72.9
.14	46.2	50.4	54.6	58.9	63.1	67.3	71.5	75.7
.15	47.9	52.2	56.6	60.9	65.3	69.6	74.0	78.3
.16	49.4	53.9	58.4	62.9	67.4	71.9	76.4	80.9
.17	51.0	55.6	60.2	64.9	69.5	74.1	78.7	83.4
.18	52.4	57.2	62.0	66.7	71.5	76.3	81.0	85.8
.19	53.9	58.8	63.7	68.6	73.5	78.4	83.3	88.1
.20	55.3	60.3	65.3	70.3	75.4	80.4	85.4	90.4
.21	56.6	61.8	66.9	72.1	77.2	82.4	87.5	92.7
.22	58.0	63.2	68.5	73.8	79.0	84.3	89.6	94.9
.23	59.3	64.7	70.0	75.4	80.8	86.2	91.6	97.0
.24	60.5	66.0	71.6	77.1	82.6	88.1	93.6	99.1
.25	61.8	67.4	73.0	78.6	84.3	89.9	95.5	101.
.26	63.0	68.7	74.5	80.2	85.9	91.7	97.4	103.
.27	64.2	70.1	75.9	81.7	87.6	93.4	99.2	105.
.28	65.4	71.3	77.3	83.2	89.2	95.1	101.	107.
.29	66.6	72.6	78.7	84.7	90.8	96.8	103.	109.
.30	67.7	73.8	80.0	86.2	92.3	98.5	105.	111.
.31	68.8	75.1	81.3	87.6	93.8	100.	106.	113.
.32	69.9	76.3	82.6	89.0	95.3	102.	108.	114.
.33	71.0	77.4	83.9	90.4	96.8	103.	110.	116.
.34	72.1	78.6	85.2	91.7	98.3	105.	111.	118.
.35	73.1	79.8	86.4	93.1	99.7	106.	113.	120.
.36	74.2	80.9	87.6	94.4	101.	108.	115.	121.
.37	75.2	82.0	88.8	95.7	103.	109.	116.	123.
.38	76.2	83.1	90.0	97.0	104.	111.	118.	125.
.39	77.2	84.2	91.2	98.2	105.	112.	119.	126.
.40	78.2	85.3	92.4	99.5	107.	114.	121.	128.
.41	79.1	86.3	93.5	101.	108.	115.	122.	129.
.42	80.1	87.4	94.7	102.	109.	116.	124.	131.
.43	81.0	88.4	95.8	103.	111.	118.	125.	133.
.44	82.0	89.4	96.9	104.	112.	119.	127.	134.
.45	82.9	90.4	98.0	106.	113.	121.	128.	136.
.46	83.8	91.4	99.1	107.	114.	122.	130.	137.
.47	84.7	92.4	100.	108.	116.	123.	131.	139.
.48	85.6	93.4	101.	109.	117.	125.	132.	140.
.49	86.5	94.4	102.	110.	118.	126.	134.	142.
.50	87.4	95.3	103.	111.	119.	127.	135.	143.
.51	88.3	96.3	104.	112.	120.	128.	136.	144.
.52	89.1	97.2	105.	113.	122.	130.	138.	146.
.53	90.0	98.1	106.	115.	123.	131.	139.	147.

Table A9-3 [continued]. Discharge of rectangular submerged orifices with bottom and side contractions suppressed, in ft3/sec. Computed from the formula $Q = 0.70A\,(2g\,\Delta h)^{0.5}$

Head Δh, ft	Cross-sectional area A of orifice, square feet						
	38	40	42	44	46	48	50
0.04	42.7	44.9	47.2	49.4	51.7	53.9	56.2
.05	47.7	50.2	52.8	55.3	57.8	60.3	62.8
.06	52.3	55.0	57.8	60.5	63.3	66.0	68.8
.07	56.5	59.4	62.4	65.4	68.4	71.3	74.3
.08	60.4	63.6	66.7	69.9	73.1	76.3	79.4
.09	64.0	67.4	70.8	74.2	77.5	80.9	84.3
.10	67.5	71.1	74.6	78.2	81.7	85.3	88.8
.11	70.8	74.5	78.3	82.0	85.7	89.4	93.2
.12	73.9	77.8	81.7	85.6	89.5	93.4	97.3
.13	77.0	81.0	85.1	89.1	93.2	97.2	101.
.14	79.9	84.1	88.3	92.5	96.7	101.	105.
.15	82.7	87.0	91.4	95.7	100.	104.	109.
.16	85.4	89.9	94.4	98.9	103.	108.	112.
.17	88.0	92.6	97.3	102.	107.	111.	116.
.18	90.6	95.3	100.	105.	110.	114.	119.
.19	93.0	97.9	103.	108.	113.	118.	122.
.20	95.5	100.	106.	111.	116.	121.	126.
.21	97.8	103.	108.	113.	118.	124.	129.
.22	100.	105.	111.	116.	121.	126.	132.
.23	102.	108.	113.	119.	124.	129.	135.
.24	105.	110.	116.	121.	127.	132.	138.
.25	107.	112.	118.	124.	129.	135.	140.
.26	109.	115.	120.	126.	132.	137.	143.
.27	111.	117.	123.	128.	134.	140.	146.
.28	113.	119.	125.	131.	137.	143.	149.
.29	115.	121.	127.	133.	139.	145.	151.
.30	117.	123.	129.	135.	142.	148.	154.
.31	119.	125.	131.	138.	144.	150.	156.
.32	121.	127.	133.	140.	146.	153.	159.
.33	123.	129.	136.	142.	148.	155.	161.
.34	124.	131.	138.	144.	151.	157.	164.
.35	126.	133.	140.	146.	153.	160.	166.
.36	128.	135.	142.	148.	155.	162.	169.
.37	130.	137.	144.	150.	157.	164.	171.
.38	132.	139.	145.	152.	159.	166.	173.
.39	133.	140.	147.	154.	161.	168.	175.
.40	135.	142.	149.	156.	163.	171.	178.
.41	137.	144.	151.	158.	165.	173.	180.
.42	138.	146.	153.	160.	167.	175.	182.
.43	140.	147.	155.	162.	169.	177.	184.
.44	142.	149.	157.	164.	171.	179.	186.
.45	143.	151.	158.	166.	173.	181.	188.
.46	145.	152.	160.	168.	175.	183.	190.
.47	146.	154.	162.	169.	177.	185.	193.
.48	148.	156.	163.	171.	179.	187.	195.
.49	149.	157.	165.	173.	181.	189.	197.
.50	151.	159.	167.	175.	183.	191.	199.
.51	152.	160.	168.	177.	185.	193.	201.
.52	154.	162.	170.	178.	186.	194.	203.
.53	155.	164.	172.	180.	188.	196.	204.

Table A9-3 [continued]. Discharge of rectangular submerged orifices with bottom and side contractions suppressed, in ft3/sec. Computed from the formula $Q = 0.70A\,(2g\,\Delta h)^{0.5}$

Head Δh, ft	Cross-sectional area A of orifice, square feet							
	55	60	65	70	75	80	85	90
0.04	61.8	67.4	73.0	78.6	84.3	89.9	95.5	101.
.05	69.1	75.4	81.6	87.9	94.2	100.	107.	113.
.06	75.7	82.6	89.4	96.3	103.	110.	117.	124.
.07	81.7	89.2	96.6	104.	111.	119.	126.	134.
.08	87.4	95.3	103.	111.	119.	127.	135.	143.
.09	92.7	101.	110.	118.	126.	135.	143.	152.
.10	97.7	107.	115.	124.	133.	142.	151.	160.
.11	102.	112.	121.	130.	140.	149.	158.	168.
.12	107.	117.	126.	136.	146.	156.	165.	175.
.13	111.	122.	132.	142.	152.	162.	172.	182.
.14	116.	126.	137.	147.	158.	168.	179.	189.
.15	120.	131.	141.	152.	163.	174.	185.	196.
.16	124.	135.	146.	157.	169.	180.	191.	202.
.17	127.	139.	151.	162.	174.	185.	197.	208.
.18	131.	143.	155.	167.	179.	191.	203.	214.
.19	135.	147.	159.	171.	184.	196.	208.	220.
.20	138.	151.	163.	176.	188.	201.	214.	226.
.21	142.	154.	167.	180.	193.	206.	219.	232.
.22	145.	158.	171.	184.	198.	211.	224.	237.
.23	148.	162.	175.	189.	202.	216.	229.	242.
.24	151.	165.	179.	193.	206.	220.	234.	248.
.25	154.	169.	183.	197.	211.	225.	239.	253.
.26	158.	172.	186.	201.	215.	229.	243.	258.
.27	161.	175.	190.	204.	219.	234.	248.	263.
.28	163.	178.	193.	208.	223.	238.	253.	268.
.29	166.	182.	197.	212.	227.	242.	257.	272.
.30	169.	185.	200.	215.	231.	246.	262.	277.
.31	172.	188.	203.	219.	235.	250.	266.	281.
.32	175.	191.	207.	222.	238.	254.	270.	286.
.33	177.	194.	210.	226.	242.	258.	274.	290.
.34	180.	197.	213.	229.	246.	262.	278.	295.
.35	183.	199.	216.	233.	249.	266.	282.	299.
.36	185.	202.	219.	236.	253.	270.	286.	303.
.37	188.	205.	222.	239.	256.	273.	290.	308.
.38	190.	208.	225.	242.	260.	277.	294.	312.
.39	193.	210.	228.	246.	263.	281.	298.	316.
.40	195.	213.	231.	249.	266.	284.	302.	320.
.41	198.	216.	234.	252.	270.	288.	306.	324.
.42	200.	218.	237.	255.	273.	291.	309.	328.
.43	203.	221.	239.	258.	276.	295.	313.	332.
.44	205.	224.	242.	261.	279.	298.	317.	335.
.45	207.	226.	245.	264.	283.	301.	320.	339.
.46	210.	229.	248.	267.	286.	305.	324.	343.
.47	212.	231.	250.	270.	289.	308.	327.	347.
.48	214.	234.	253.	272.	292.	311.	331.	350.
.49	216.	236.	256.	275.	295.	315.	334.	354.
.50	218.	238.	258.	278.	298.	318.	338.	357.
.51	221.	241.	261.	281.	301.	321.	341.	361.
.52	223.	243.	263.	284.	304.	324.	344.	365.
.53	225.	245.	266.	286.	307.	327.	348.	368.

Table A9-3 [continued]. Discharge of rectangular submerged orifices with bottom and side contractions suppressed, in ft3/sec. Computed from the formula $Q = 0.70A\,(2g\,\Delta h)^{0.5}$

Head Δh, ft	Cross-sectional area A of orifice, square feet						
	95	100	105	110	115	120	125
0.04	107	112	118	124	129	135	140
.05	119	126	132	138	144	151	157
.06	131	138	144	151	158	165	172
.07	141	149	156	163	171	178	186
.08	151	159	167	175	183	191	199
.09	160	169	177	185	194	202	211
.10	169	178	187	195	204	213	222
.11	177	186	196	205	214	224	233
.12	185	195	204	214	224	234	243
.13	192	203	213	223	233	243	253
.14	200	210	221	231	242	252	263
.15	207	218	228	239	250	261	272
.16	213	225	236	247	258	270	281
.17	220	232	243	255	266	278	290
.18	226	238	250	262	274	286	298
.19	233	245	257	269	282	294	306
.20	239	251	264	276	289	301	314
.21	245	257	270	283	296	309	322
.22	250	263	277	290	303	316	329
.23	256	269	283	296	310	323	337
.24	261	275	289	303	316	330	344
.25	267	281	295	309	323	337	351
.26	272	286	301	315	329	344	358
.27	277	292	306	321	336	350	365
.28	282	297	312	327	342	357	372
.29	287	303	318	333	348	363	378
.30	292	308	323	338	354	369	385
.31	297	313	328	344	360	375	391
.32	302	318	334	350	365	381	397
.33	307	323	339	355	371	387	403
.34	311	328	344	360	377	393	409
.35	316	332	349	366	382	399	415
.36	320	337	354	371	388	404	421
.37	325	342	359	376	393	410	427
.38	329	346	364	381	398	416	433
.39	333	351	368	386	403	421	439
.40	338	355	373	391	409	426	444
.41	342	360	378	396	414	432	450
.42	346	364	382	400	419	437	455
.43	350	368	387	405	424	442	460
.44	354	373	391	410	429	447	466
.45	358	377	396	415	433	452	471
.46	362	381	400	419	438	457	476
.47	366	385	404	424	443	462	481
.48	370	389	409	428	448	467	486
.49	374	393	413	433	452	472	492
.50	377	397	417	437	457	477	497
.51	381	401	421	441	461	481	501
.52	385	405	425	446	466	486	506
.53	389	409	429	450	470	491	511